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Land and Water Evaluation of Lowland Areas
Case Study: Lowlands in North Eastern Muara Enim
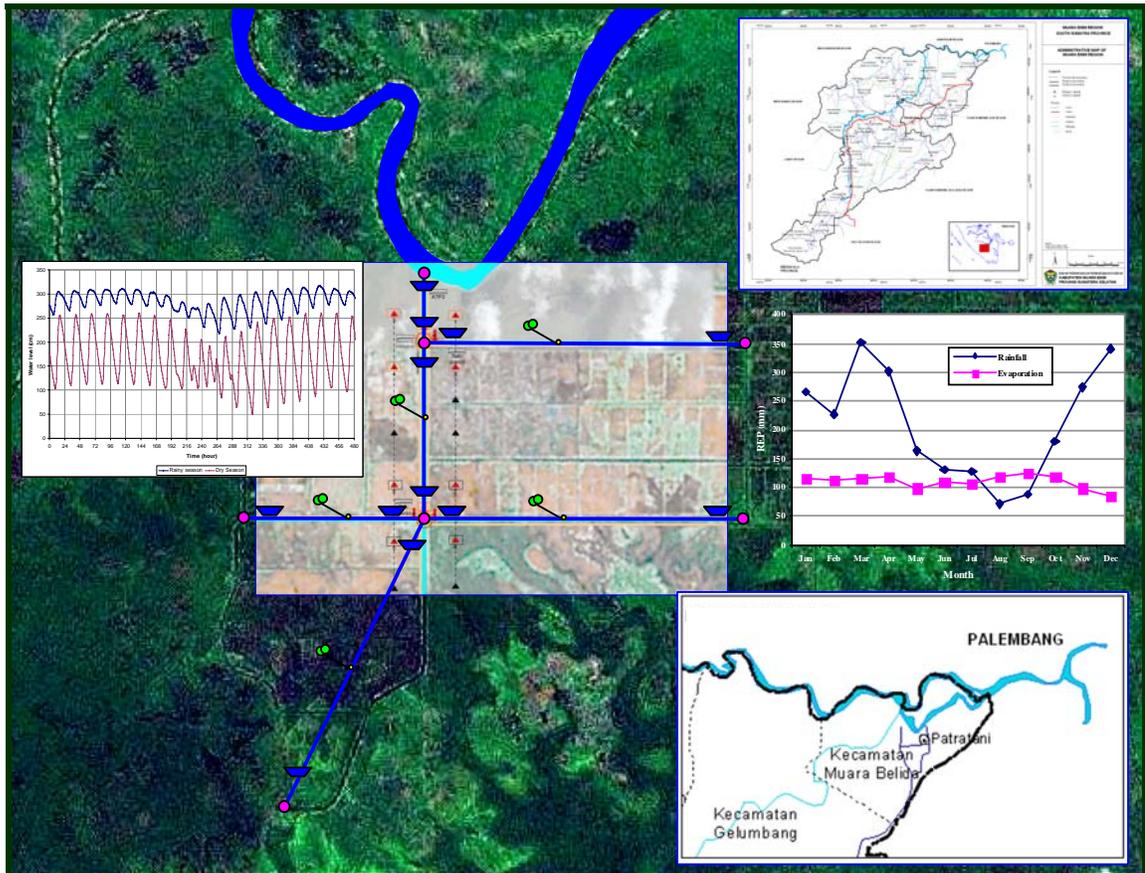## Region Indonesia

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MSc Thesis WSE-HE-LWD-09-11

OCTOBER 2009

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Master of Science Thesis
by
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This research is done for the partial fulfilment of requirements for
Master of Science (MSc) degree at the UNESCO-IHE Institute for Water Education, Delft, the Netherlands and
Magister Sains (MSi) at Sriwijaya University, Palembang, Indonesia

Delft
October 2009

Summary

Lowland is one type of land which plays an important role in human civilization. Many generations have developed this type of land for various purposes. Other than as a buffer zone, lowland has been developed for settlements and food production area.

Indonesia population growth projection in combination with agricultural land conversion promotes development into marginal space such as sloping, lowland and coastal regions. In the next turn with the increasing population, spatial problems such as housing, roads and farming areas would elevate. Industrialization and urbanization in addition, related to land resource competition, food issues would be the main one.

In competition with urbanization and industrialization, farmlands are becoming scarcer. Therefore, food productivity per unit land and water has to be given a major focus to ensure food sufficiency and food security.

The main objectives of this study are to evaluate land suitability of the lowland schemes and to assess the water management possibilities of the existing canals on optimizing land and water to support food productivity.

The study area is lowland area, which is located in the Northeast Muara Enim Region. The area is composed by tidal lowland along Meriak River and undrained lowlands in the inland. The detailed monitoring area is the area along the main canal ending to Meriak River.

Methodology used in this study was by evaluating land suitability, hydraulic performance of main canals, and crop water requirement of the study area. Land suitability was evaluated by using the Geographic Information System (GIS) ArcGIS in order to identify size and proportion of the land for agricultural commodity, rice and dryland crops. Another analysis on drainage canals developed to maintain water balance in the area was to identify the performance for providing water for crops. This was analyzed by using DUFLOW. The final analysis was done to develop a model of crop water requirement in the lowland, which was by applying CROPWAT equations.

Spatial evaluation shows that the study area is composed of more than 90% of lowland and about 10% dryland. Based on land affected by water level fluctuation in the river, there is about 24% of the land classified as A, which is inundated during the rainy season and dry season. This land is suitable for lowland rice or fisheries. Category B, which is for the area periodically flooded by tide during the wet season, is about 25%. This area can be cultivated by lowland paddy in the wet season and dryland crops at the end of the wet season. Category C and D is about 43% and 8%, respectively. Category C is just above tidal influence and category D is for the land completely above the tidal influence. As a result, the groundwater in the C areas may still be influenced by tides.

The structures installed in the canals operate properly to maintain the preferred water level in the canals. For that reason, improved structures are required to be put in the canals system. Crops planted in the area have sufficient water from the water available along the year. However, optimizing water management is needed for now.

Dealing with land subsidence and sea level rise in the future due to reclamation and activities on the land, the proportion of the category of the land affected by tide would be changed. Applying limited data in the field, category A, B, C, D of the land in the future would be 28%, 54%, 18% and 1%.

In conclusion, Patra Tani is located in lowland area which some parts of this area are suitable for agricultural development such as lowland rice and dryland crops. Commodity of rice, maize, and perennial crops would be cultivated in this area. Canal systems are effective to control the water level in the area. Cropping patterns that may be applied in this area are rice and maize. Land subsidence should be considered for long term.

The recommendations in optimising land and water management in Patra Tani are by planting commodity, which is suitable to the land and water characteristic, maintaining the water level to reduce land subsidence of the area and applying a planting schedule for one year.